SERVICE MANUAL

Order NO. Ref1409S001V0

Refrigerator

MODEL: HA10TG31SW
HA10TG31SB
HA10TG31SS

WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It dose not contain warnings and cautions to advice non-technical individuals of potential dangers in attempting to service a product. Product powered by electricity should by serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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Chapter 1 General Information

1-1. General Guidelines

When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

1) Leakage Current Cold Check

2) Leakage Current Hot Check

3) Prevention of Electro Static Discharge (ESD) to Electrostatic Sensitive

1-2. Insurance Test

1. Check if there is any leak of current.
2. Cut out the power supply before the repair to avoid an electrical shock hazard.
3. In the case of a live-line test, insulating gloves should be worn to avoid potential electrical shock.
4. Confirm the rated current, voltage and capacity before testing with any kinds of instruments.
5. Watch if the upper door is open when we check something at a lower position.
6. Take out every part in the cabinet before moving the machine, especially things like panels (e.g. glass shelf).
7. Please wear intact cotton gloves when repair any parts of the evaporator, so that scratches by the sharp fins can be avoided.
8. If there is a breakdown with the refrigeration system, please surrender the machine to the service center, else the leaked refrigerant may pollute the atmosphere.
9. The refrigerator use AC of 115V with a frequency of 60Hz.
10. A big fluctuation of voltage (exceed the range 100～120V) may cause a start failure of the refrigerator, a burn-out of the control panel and compressor, or an abnormal sound from the compressor in operation.

11. Take care not to damage the supply line. Don't yank at the line; pull the plug out gently from the receptacle. Don't press the line under the cabinet or step on it. Take care not to roll on or damage the supply line when moves the machine from the wall.

12. In the case of leakage of inflammable gases like carbon monoxide, open the door and windows. Don't pull out or insert the plugs of the appliance.

13. Don't touch the refrigeration surface of the freezing compartment when the refrigerator is in operation, especially when our hand is wet, else we may be glued to the surface.

14. Pull out the plug of power supply during clearance or power outage. Wait at least five minutes to resume the power supply in order to prevent damage to the compressor caused by continuous restart.

Photo used in this manual

The illustration and photos used in this Manual may not base on the final design of products, which may differ from the products in some way.

1-3. How to read this Service Manual

1-3-1. Using Icons

Icons are used to attract the attention to specific information. The meaning of each icon is described in the table below:

Note:

A "note" provides information that is not indispensable.

Caution:

A "caution" is used when there is danger that the reader, through incorrect manipulation, may damage equipment, loose data, get an unexpected result or has to restart (part of) a procedure.

Warning:

A "warning" is used when there is danger of personal injury.

Reference: A "reference" guides to find additional information on a specific topic.

Chapter 2 Product Feature

2-1. Specifications

Photo			
Model	HA10TG31SW	HA10TG31SB	HA10TG31SS
Type of appliance (FS=free standing / BI= built-in)	FS	FS	FS
Climate class (N=16-32℃ ST=16-38℃ T=18-43℃)	T	T	T
Gross capacity	286.3 L	286.3 L	286.3 L
Total net capacity	286.3 L	286.3 L	286.3 L
Defrosting (Manual-Automatic)	Automatic	Automatic	Automatic
Defrosting water outlet	Yes	Yes	Yes
Air circulating ventilator	Yes	Yes	Yes
Kind of coolant (R134a/R600a)	R600a	R600a	R600a
Voltage / frequency(V/Hz)	115~ / 60	115~ / 60	115~ / 60
Input power (W /A)	70/2	70/2	70/2
Length of cable / incl. plug (cm)	200	200	200
Temperature range (from>to)	4～-18°C	4～-18°C	4～-18°C
Control panel	Manual	Manual	Manual
Control panel (interior/exterior)	interior	interior	interior
Interior light(W)	1.5	1.5	1.5
Unit dimensions (H / W / D)(mm)	1512/597/646	1512/597/646	1512/597/646
Depth of open door(mm)	1195	1195	1195
Net weight(Kg)	59	59	59
Packing dimensions (H / W / D)(mm)	1555/660/703	1555/660/703	11555/660/703
Gross weight(kg)	68	68	68

2-2.Compressor Parameter

Part Name	Check Method and Criterion			
Compressor	Measure the resistance with a tester. (Ambient temperature : Room temperature 25°C)			
	Model		Main Wiring	Auxiliary Wiring
	ATH50U6	Normal	4.1 Ω	6.36Ω
		Abnormal	Open(∞Ω) or Short Circuited (0 Ω)	
PTC Starter Relay	Measure the resistance with a tester. (Ambient temperature : Room temperature 25°C)			
	Model	QP3-4.7A-G1		
	Normal	4.7 Ω		
	Abnormal	Open(∞Ω) or Short Circuited (0Ω)		
Overload Protector	Measure the resistance with a tester. (Ambient temperature : Room temperature 25°C)			
	Model	BT78-120		
	Normal	Less than 1 Ω		
	Abnormal	Open(∞Ω) or Short Circuited (0Ω)		
Running Capacitor	Measure the resistance with a tester. (Ambient temperature : Room temperature 25°C)			
	Model	CBB65A-2		
	Normal	Open(∞Ω)		
	Abnormal	Short Circuited (0Ω)		

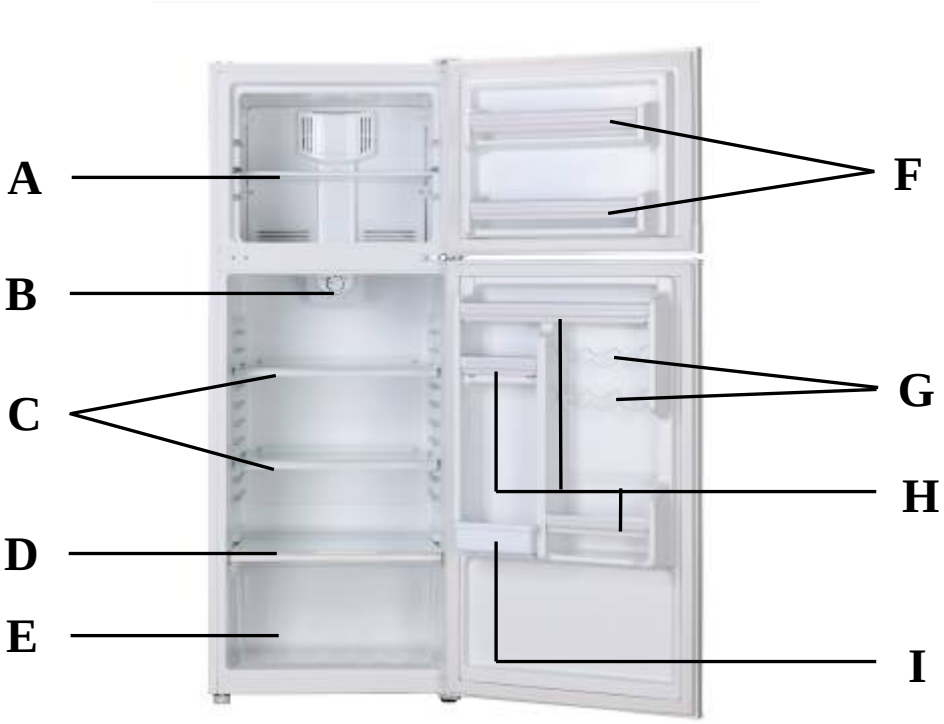
2-3. Fan Parameter

No.	Characteristic	Value	Unit
1	Rated voltage	115	V
2	Input power	5.9	w
3	Output power	2.2	w
4	Rotate speed with load	3000	rpm
5	* Rated frequency	60	Hz
6	Voltage range	104-126	V

2-4.Defrosting Heater Parameter

No.	Characteristic	Value	Unit
1	Rated voltage	115	V
2	Output power	150	w
3	Heater length	700	mm

2-5. External views



A= freezer shelf	B= control panel	C= shelf	D= crisper cover	E= crisper
F= door shelf	G= coke shelf	H= butter tray	I=door rack	

2-6. Function Schedule

1. Air-cooling and automatic defrosting
2. Round door design and fashion handles
3. Energy-saving
4. Adjustable humidity crisper
5. Isolated food shelf
6. Crisper with adjustable moisture

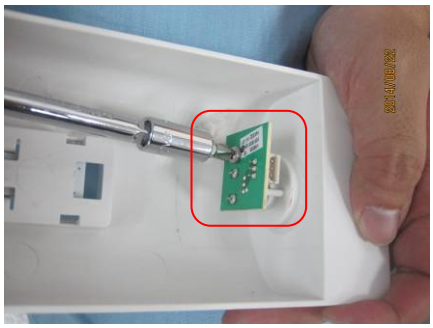
Chapter 3 Disassembly

3-1. FRZ Air duct disassembly

1	Remove four screws which fixed the air passage cover. with screwdriver .	
2	Hold the protruding part of the air passage cover as picture, disconnect the fan motor cable connectors and then take off the air passage cover.	
3	We assemble it according to reverse order.	

3-2. REF air duct assembly disassembly

1	Remove three screws which fixed the thermostat house. with screwdriver	
2.	Disconnect all the cable connectors, take out the assembly	
3	Take off the tape	
4	Take off the sensor	
5	Remove the LED cover	

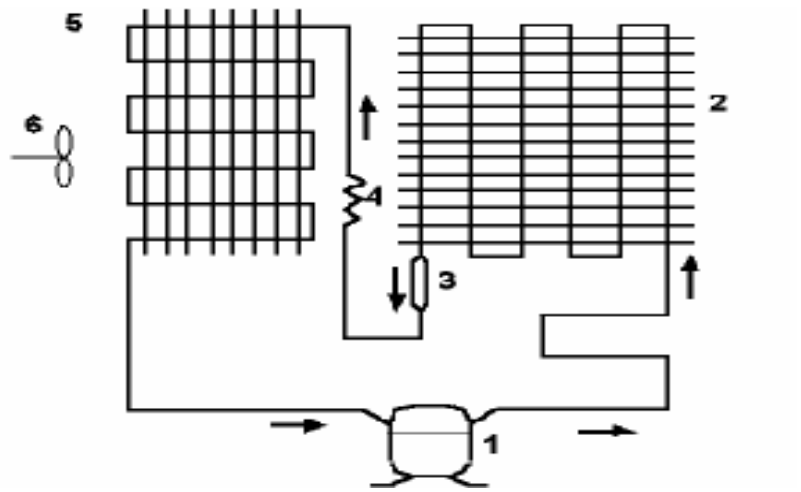
6	Take off the LED	
7	Take off the screws and control panel could be removed	
8.	Take off the knob	
9	Take off the foam assembly	
10	We assemble it according to reverse order.	

3-3.Door disassembly

1	Take off the screws which fixed the top hinge box, and remove the hinge box.	
2.	Remove the screws which fixed the top hinge, take it off	
3	Take off the screws which fixed the central hinge	
4	Hold the REF and FRZ door with our hands and drag it slightly, and then we could take off the door.	

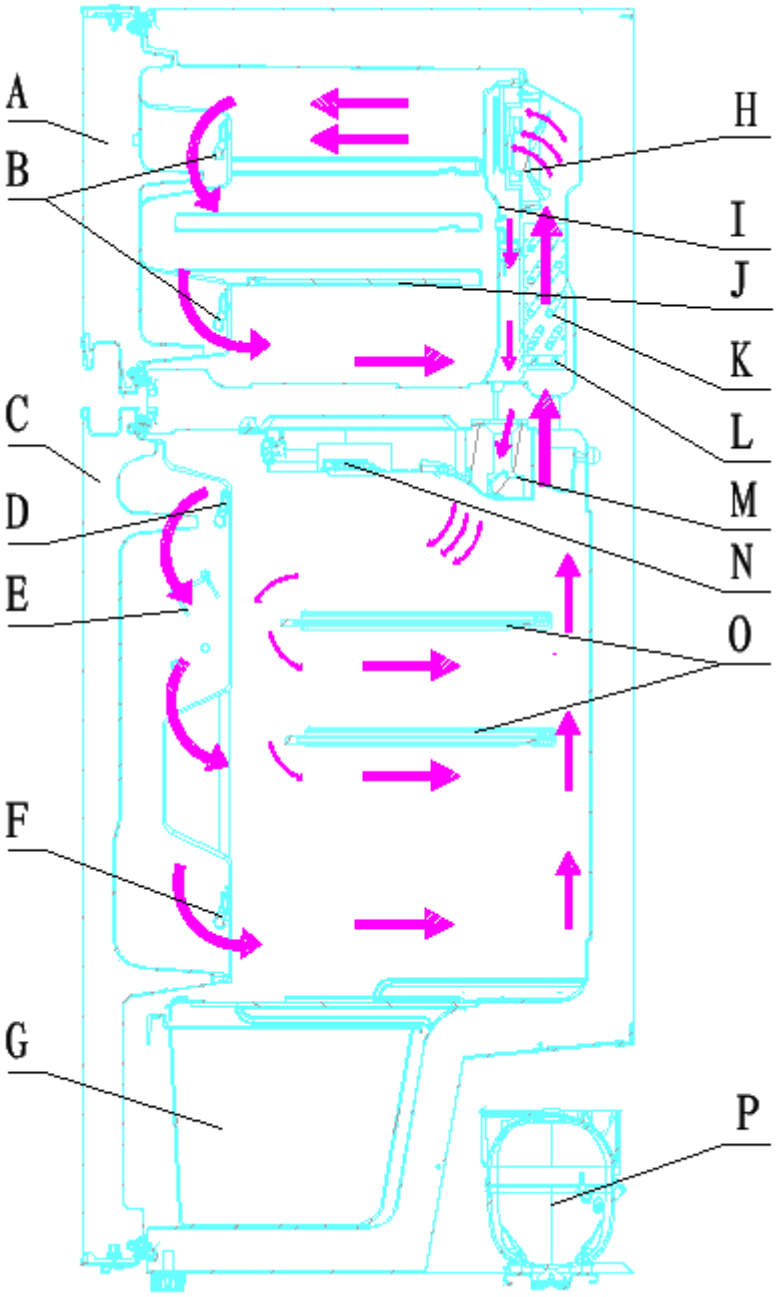
Chapter 4 System flow principle

4-1. Refrigeration flow chart



1 Compressor
2 Condenser
3 Filter drier
4 Capillary tube
5 Evaporator
6 Fan motor

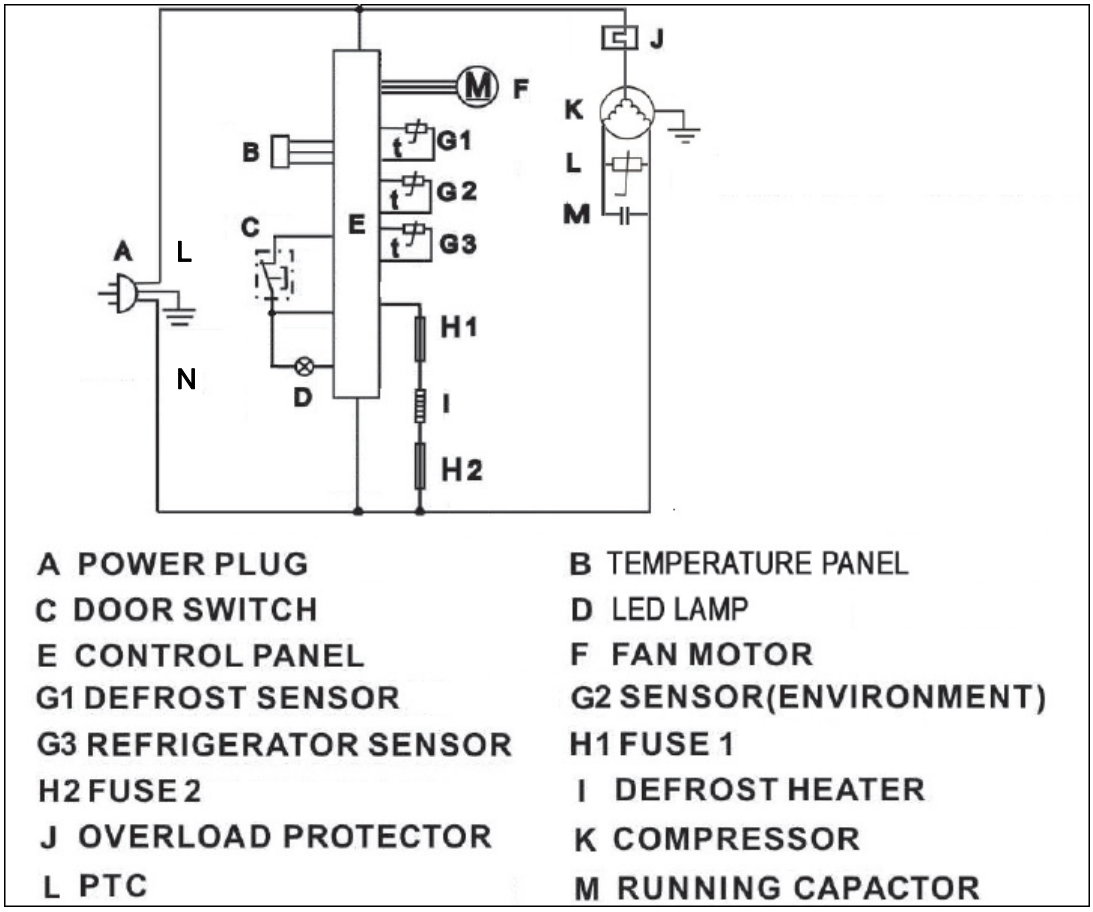
4-2.Flow of cold air



A=freezer door	B=door rack	C= Ref door	D=door rack	E=can shelf	F=door rack
G=crisper	H=fan motor	I=fan cover	J=freezer shelf	K= evaporator	
L= defrost heater	M=air tower	N=LED	O=ref shelf	P= compressor	

Chapter 5 Circuit diagram

5-1. Brief principle diagram

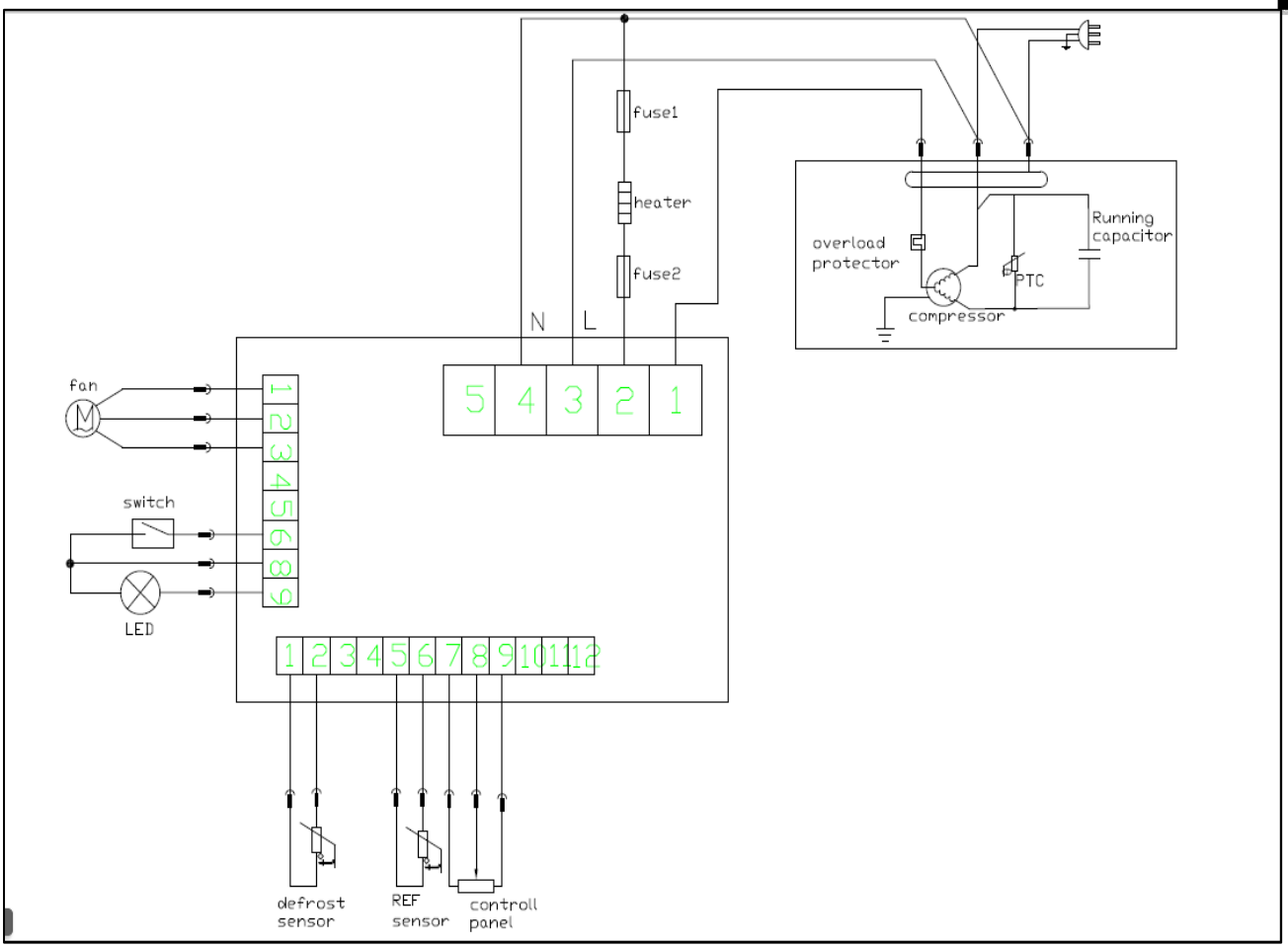


Brief Description of Control Principle

The refrigerator is controlled by control PCB, REF sensor controls the operation of compressor ,also fridge temperature.

When ambinet is too low,ambinet sensor(on control PCB)will adjust the operation ON/OFF point to ensure fridge temperature ,

5-2. Control PCB diagram

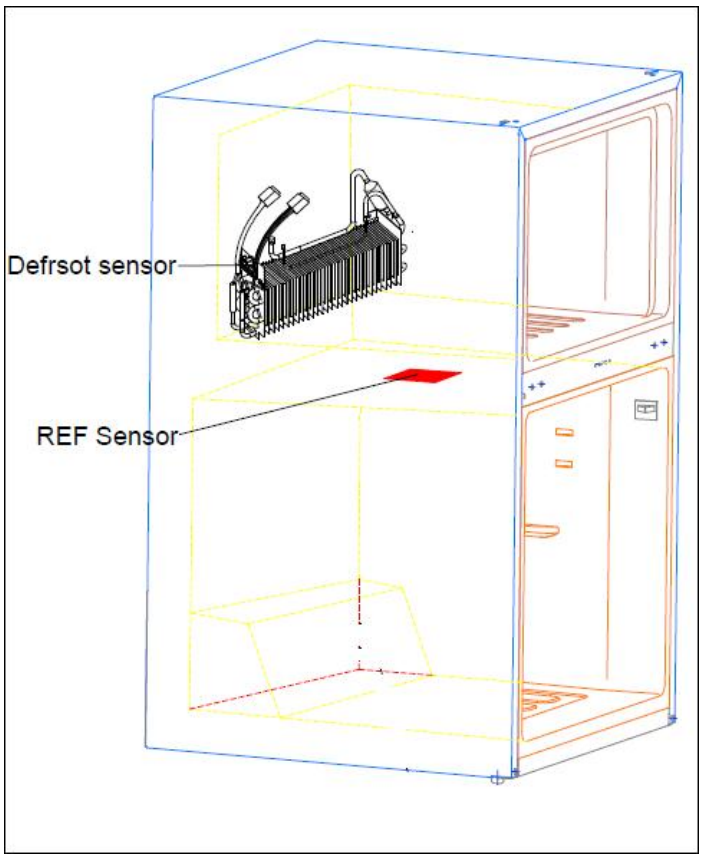


5-3.Defrosting Principle

1. A defrost cycle will start after an accumulated compressor run time of 4 hours.
2. Automatic Defrost
   2.1 It could enter defrost after an accumulated compressor run time of 3~48 hours according to ambinet temperature,door open–close
   2.2 It will stop defrosting when defrost sensor temperature reach 12℃or the defrost time is up to 50 munutes.
   2.3 If the defrost time does not reach 50 minutes,but the temperature reaches 12 ℃,the defrost will be stopped immediately.
3. Rated defrost heater power :150W.

Note: It must be in rated voltage 115V/60Hz, above parameters is practical.

5-4. Sensor location



Sensor resistance

TEMPERATURE	FRZ Resistance(K)	TEMPERATURE	REF Resistance
-40	64.11	-40	63.42
-39	60.10	-39	59.45
-38	56.35	-38	55.74
-37	52.86	-37	52.29
-36	49.61	-36	49.08
-35	46.58	-35	46.07
-34	43.74	-34	43.27
-33	41.10	-33	40.65
-32	38.63	-32	38.21
-31	36.32	-31	35.93
-30	33.84	-30	33.07
-29	31.88	-29	31.16
-28	30.04	-28	29.37
-27	28.32	-27	27.69
-26	26.70	-26	26.12
-25	25.19	-25	24.64
-24	23.77	-24	23.25
-23	22.43	-23	21.95
-22	21.18	-22	20.73
-21	20.00	-21	19.58
-20	18.90	-20	18.50
-19	17.86	-19	17.49
-18	16.89	-18	16.54
-17	15.97	-17	15.64
-16	15.11	-16	14.80
-15	14.30	-15	14.00
-14	13.53	-14	13.25
-13	12.81	-13	12.55
-12	12.14	-12	11.89
-11	11.50	-11	11.27
-10	10.90	-10	10.68
-9	10.33	-9	10.12
-8	9.800	-8	9.600
-7	9.296	-7	9.108
-6	8.821	-6	8.643
-5	8.373	-5	8.204
-4	7.950	-4	7.790
-3	7.551	-3	7.398
-2	7.173	-2	7.029

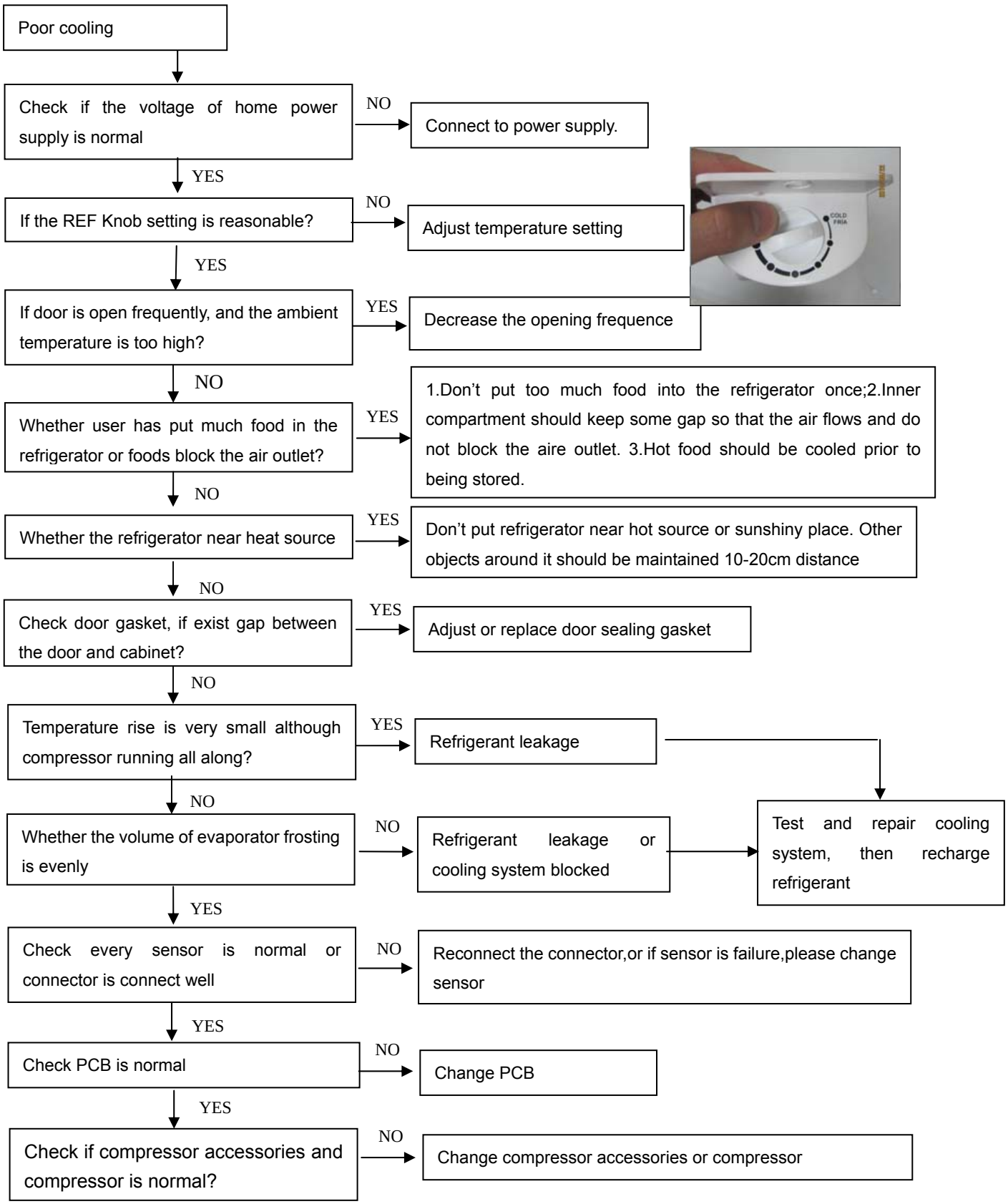
-1	6.817	-1	6.680
0	6.480	0	6.350
1	6.162	1	6.038
2	5.861	2	5.743
3	5.576	3	5.464
4	5.306	4	5.201
5	5.051	5	4.951
6	4.810	6	4.714
7	4.581	7	4.491
8	4.365	8	4.279
9	4.160	9	4.078
10	3.965	10	3.887
11	3.781	11	3.707
12	3.606	12	3.536
13	3.440	13	3.373
14	3.283	14	3.219
15	3.134	15	3.073
16	2.922	16	2.935
17	2.858	17	2.803
18	2.730	18	2.678
19	2.609	19	2.559
20	2.493	20	2.446
21	2.384	21	2.339
22	2.280	22	2.237
23	2.180	23	2.140
24	2.086	24	2.047
25	1.977	25	1.960
26	1.911	26	1.876
27	1.830	27	1.796
28	1.753	28	1.721
29	1.679	29	1.649
30	1.609	30	1.580
31	1.542	31	1.514
32	1.478	32	1.452
33	1.418	33	1.392
34	1.360	34	1.339
35	1.304	35	1.281
36	1.252	36	1.230
37	1.201	37	1.181
38	1.153	38	1.134
39	1.108	39	1.089
40	1.064	40	1.046

5-5.PCB Test

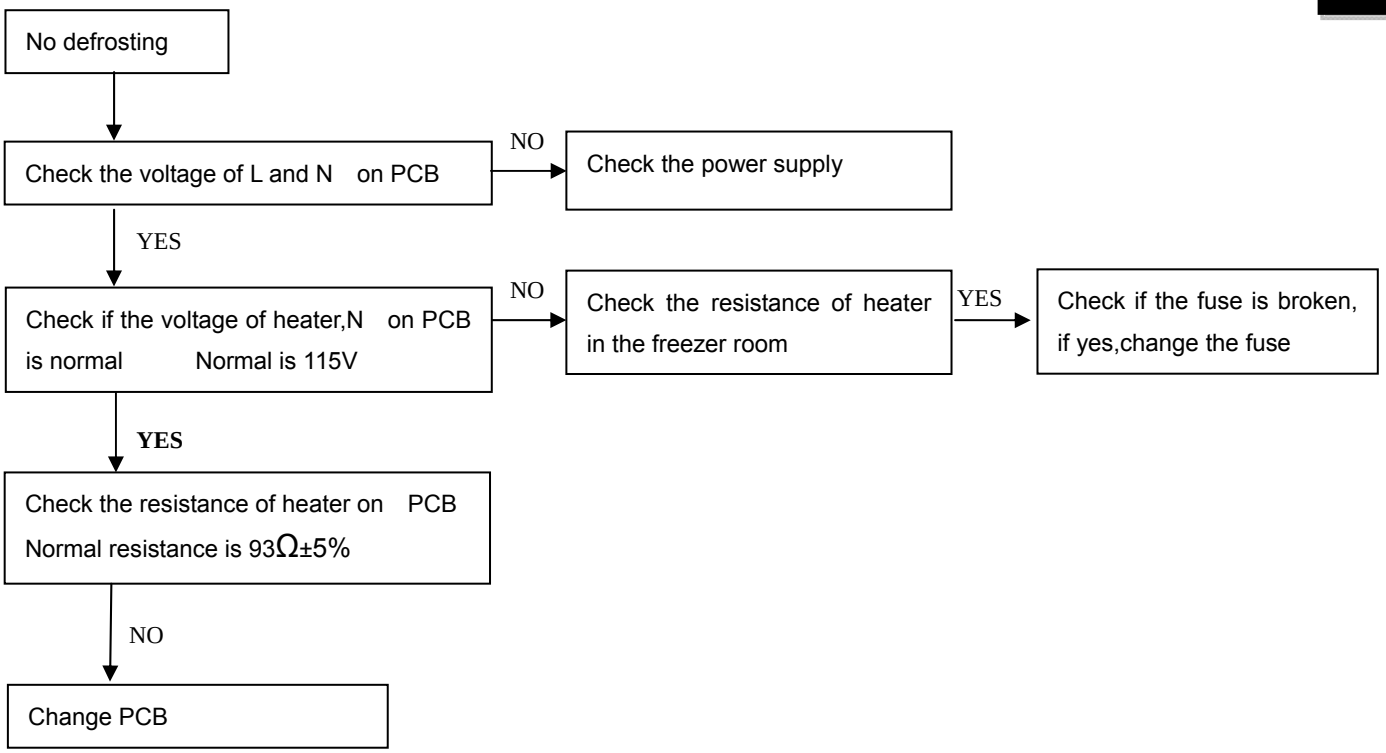
1. The products will enter compulsive starting mode if press the key one time on the control PCB.In this mode,the compressor and the fan motor start working .
2. The same operation like step 1 again under compulsive starting mode ,The products will enter forcing defrosting mode .Under this mode,the compressor and fan motor stop working.Defrost heater starts working.
3. The same operation like step 1 under forcing defrosting mode ,it will back to normal.

Chapter 6 Trouble shooting

6-1. Poor cooling


Poor cooling
Check if the voltage of home power supply is normal
NO
Connect to power supply.
YES
If the REF Knob setting is reasonable?
NO
Adjust temperature setting
YES
If door is open frequently, and the ambient temperature is too high?
YES
Decrease the opening frequence
NO
Whether user has put much food in the refrigerator or foods block the air outlet?
YES
1.Don't put too much food into the refrigerator once;2.Inner compartment should keep some gap so that the air flows and do not block the aire outlet. 3.Hot food should be cooled prior to being stored.
NO
Whether the refrigerator near heat source
YES
Don't put refrigerator near hot source or sunshiny place. Other objects around it should be maintained 10-20cm distance
NO
Check door gasket, if exist gap between the door and cabinet?
YES
Adjust or replace door sealing gasket
NO
Temperature rise is very small although compressor running all along?
YES
Refrigerant leakage
NO
Whether the volume of evaporator frosting is evenly
NO
Refrigerant leakage or cooling system blocked
Test and repair cooling system, then recharge refrigerant
YES
Check every sensor is normal or connector is connect well
NO
Reconnect the connector,or if sensor is failure,please change sensor
YES
Check PCB is normal
NO
Change PCB
YES
Check if compressor accessories and compressor is normal?
NO
Change compressor accessories or compressor

6-2. No defrosting


No defrosting
Check the voltage of L and N on PCB
NO
Check the power supply
YES
Check if the voltage of heater,N on PCB is normal Normal is 115V
NO
Check the resistance of heater in the freezer room
YES
Check if the fuse is broken, if yes,change the fuse
YES
Check the resistance of heater on PCB Normal resistance is 93Ω±5%
NO
Change PCB

If defrost time is too long and cause temperature too high,it needs to check defrost sensor

SERVICE MANUAL

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Sincere forever

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